## IN THE CLAIMS

- 1. (original) A recombinant cell which expresses a holo-phycobiliprotein fusion protein comprising a heterologous-to-the-cell, fluorescent, first holo-phycobiliprotein domain fused to a heterologous protein domain, wherein the cell makes and comprises components: a bilin, a recombinant bilin reductase, an apo-phycobiliprotein fusion protein precursor of the fusion protein comprising a corresponding apo-phycobiliprotein domain, and a recombinant phycobiliprotein domain-bilin lyase, which components react inside the cell to form the holophycobiliprotein fusion protein.
- 2. (original) The cell of claim 1, wherein the cell further comprises a heme and a heme oxygenase which react to form the bilin.
- 3. (original) The cell of claim 1, wherein the cell further comprises a heme and a recombinant heme oxygenase which react to form the bilin.
- 4. (original) The cell of claim 1, wherein the cell further comprises a heme and a recombinant heme oxygenase which react to form the bilin, and the recombinant heme oxygenase is HO1.
- 5. (original) The cell of claim 1, wherein the heterologous protein domain is fluorescent and spectroscopically distinguishable from the first holo-phycobiliprotein domain.
- 6. (original) The cell of claim 1, wherein the heterologous protein domain is fluorescent and spectroscopically distinguishable from the first holo-phycobiliprotein domain, and the heterologous protein domain comprises a heterologous-to-the-cell, fluorescent, second holo-phycobiliprotein domain.
- 7. (original) The cell of claim 1, wherein the heterologous protein domain is fluorescent and spectroscopically distinguishable from the first holo-phycobiliprotein domain, and the heterologous protein domain comprises a phytochrome domain.

- 8. (original) The cell of claim 1, wherein the heterologous protein domain is fluorescent and spectroscopically distinguishable from the first holo-phycobiliprotein domain, and the heterologous protein domain comprises a green fluorescent protein (GFP) domain.
- 9. (original) The cell of claim 1, wherein the heterologous protein domain is fluorescent and spectroscopically distinguishable from the first holo-phycobiliprotein domain, and the fusion protein provides fluorescence resonance energy transfer between the first holo-phycobiliprotein domain and the heterologous protein domain.
- 10. (original) The cell of claim 1, wherein the cell is a mammalian cell.
- 11. (original) The cell of claim 1, wherein the cell is a yeast cell.
- 12. (original) The cell of claim 1, wherein the cell is a bacterial cell.
- 13. (Previously presented) The cell of claim 1, wherein the cell is an Escherichia coli cell.
- 14. (Canceled) The cell of claim 1, wherein the cell is in vitro.
- 15. (Canceled) The cell of claim 1, wherein the cell is in situ.
- 16. (original) The cell of claim 1, wherein the bilin is phycocyanobilin (PCB), the reductase is 3Z-phycocyanobilin:ferredoxin oxidoreductase (PcyA), the apo-phycobiliprotein domain is phycocyanin  $\alpha$  subunit domain, and the lyase is heterodimeric phycocyanin  $\alpha$  subunit phycocyanobilin lyase (CpcE and CpcF).
- 17. (Previously presented) The cell of claim 1, wherein the bilin is phycocyanobilin (PCB), the reductase is 3Z-phycocyanobilin:ferredoxin oxidoreductase (PcyA), the apo-phycobiliprotein domain is phycoerythrocyanin apo-α subunit domain, and the lyase is heterodimeric phycoerythrocyanin α subunit phycoerythrocyanobilin lyase (PecE and PecF), which further

3 09/919,486

catalyzes the isomerization of the bilin to phycobiliviolin.

- 18. (original) The cell of claim 1, wherein the bilin is phycoerythrobilin (PEB), the reductase is 3Z-phycoerythrobilin:ferredoxin oxidoreductase (PebA and PebB), the apo-phycobiliprotein domain is phycoerythrin apo- $\alpha$  subunit domain, and the lyase is heterodimeric C-phycoerythrin  $\alpha$  subunit phycoerythrobilin lyase (CpeY and CpeZ).
- 19. (Withdrawn) A method for making a holo-phycobiliprotein fusion protein, comprising growing the cell of claim 1 under conditions wherein the cell expresses the holo-phycobiliprotein fusion protein.
- 20. (Withdrawn) The method of claim 19, further comprising the step of isolating the holophycobiliprotein fusion protein.
- 21. (Withdrawn) The method of claim 19, further comprising the step of specifically detecting the holo-phycobiliprotein fusion protein.
- 22. (Withdrawn) The method of claim 19, further comprising the step of specifically detecting the holo-phycobiliprotein fusion protein within the cell.
- 23. (Canceled) A recombinant cell which conditionally expresses a heterologous-to-the-cell, fluorescent, first holo-phycobiliprotein domain, wherein the cell makes and comprises components: a bilin, a recombinant bilin reductase, an apo-phycobiliprotein domain, and a recombinant phycobiliprotein domain-bilin lyase, wherein at least one of the reductase, apo-phycobiliprotein domain and lyase is expressed upon activation of a targeted transcriptional promoter, whereupon the components react inside the cell to form the holo-phycobiliprotein domain, which provides a reporter for the activation of the promoter.
- 24. (Canceled) A method for making a holo-phycobiliprotein, comprising growing the cell of claim 23 under conditions wherein the cell expresses the holo-phycobiliprotein.

4 09/919,486